Notes on Caribbean Discomycetes.

IV. COOKEINA VENEZUELAE, C. COLENSOI AND THE GENUS BOEDIJNOPEZIZA

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SUMMARY

A gelatinous layer is reported in the sterile tissue of the apothecium of Cookeina venezuelae. Cookeina venezuelae is compared to C. colensoi which was previously reported as having a gelatinous layer. Discina epixyla and D. pululahuana are synonymized with C. venezuelae on the basis of type studies. A study of C. insititia, type of Boedijnopeziza, shows that it is anatomically similar to C. venezuelae and C. colensoi. Boedijnopeziza is not accepted.

INTRODUCTION

SINCE Seaver (1928) synonymized Peziza venezuelae Berk. & Curt. in Cooke with Cookeina colensoi (Berk.) Seaver, there has been confusion over the identity of the two species. Le Gal (1953) first pointed out Seaver's error. In his description of C. colensoi he had stated that the spores are usually marked with delicate, longitudinal striations. Le Gal studied P. venezuelae and found that its spores were striate, but those of C. colensoi were smooth. Consequently, she properly treated P. venezuelae as a distinct species of Cookeina. However, because the geographical distribution of the two species coincides in part and because both are sessile to sub-sessile, semi-hairless Discomycetes, the distinction has remained perplexing. Of the two species only C. venezuelae (Berk. & Curt.) Le Gal is known from the West Indies, though both occur in South America.

This paper presents a detailed description of the sterile tissue of the apothecia in Cookeina venezuelae and compares it with that of C. colensoi.

Further, during this study, type specimens of two other tropical American species were examined. As a result Discina epixyla Pat. from Guadeloupe and D. pululahuana from Ecuador have been synonymized with C. venezuelae.

The paper by Denison (1967) should be consulted for identification of Cookeinas from the Americas.

MATERIALS AND METHODS

All observations were made using 20-35 µm apothecial cross sections cut with a freezing microtome. All dried apothecia were soaked in water for 1 hr prior to sectioning. Sections were stained with cotton blue-lactophenol.

OBSERVATIONS

COOKEINA VENEZUELAE (Berk. & Curt. in Cooke) Le Gal, Prodr. Flore Mycol. Madagascar 4: 241 & 247. 1953.
≡ Peziza venezuelae Berk. & Curt. in Cooke, Mycographia p. 120. 1879.
= Discina epixyla Pat. in Duss, Enum. Champ. à la Guadeloupe et à la Martinique. p. 63. 1903.
= Discina pululahuana Pat., Bull. Soc. Mycol. France 9: 145. 1893.

Apothecial anatomy -- Subhymenium: textura intricata - textura porrecta, not a well defined layer. Medullary excipulum: 80-90 µm thick; inner zone: hyphae 3.0 - 3.5 µm in diam, hyphae parallel to one another (textura porrecta) and also parallel to the outer surface of the apothecium; outer zone: 66 - 88 µm thick, hyphae 1.6 - 20 µm in diam, parallel to one another, but perpendicular to the outside of the apothecium, surrounded by refractive gelatinous material which does not stain in cotton blue-lactophenol. Ectal excipulum: textura globulosa to textura angularis, 3-5 cells thick, cells 8 - 20 µm in diam, radially arranged, outer layer of cells giving rise to occasional groups of thick-walled globose or elongate cells which extend to form short hairs or pustules.

The structure of the medullary excipulum and the ectal excipulum is shown in fig. 1.

COOKEINA COLENSOI (Berk.) Seaver, Mycologia 5: 191. 1931.

Apothecial anatomy— The apothecia of C. colensoi are basically as described for C. venezuelae except that the gelatinous zone may be thinner (up to 65 µm) and the hyphae in the gelatinous zone tend not to be as strictly parallel as in C. venezuelae. Le Gal (1953) described and illustrated the apothecia accurately except for the omission of the gelatinous zone and the hyphae within it. Korf (1973) has already suggested the presence of gel in this species.

SPECIMENS EXAMINED

Cookeina venezuelae - Ecuador: sur la terre (probably on buried wood or wood fragments), leg, Lagerhein, Pululahua, février 1892 (holotype of Discina pululahuana, FH). Guadeloupe: sur toutes sortes de bois pourris, Camp-Jacob, bois de la Rivière Saint-Louis, Duss (527),(holotype of Discina epixyla, FH); sur toutes sortes de branches mortes, bois de la Rivière, St. Louis, février, 1904, Duss (249),(authentic material of D. epixyla, FH). Jamaica: on wood, along trail between Woodcutter's Gap and ruins of Major Wallin's house, vicinity of Newcastle, Portland Parish, 9.I.1971, R. P. Korf et al. (CUP-MJ-139); on twigs, along Lady's Mile Trail to just south of Woodcutter's Gap, vicinity of Newcastle, border of St. Andrew and Portland Parishes, 9.I.1971, R. P. Korf et al. (CUP-MJ-146, CUP-MJ-176); along Ulster Road Trail, Newcastle, St. Andrew Parish, 9.I.1971, R. P. Korf et al. (CUP-MJ-197); on wood, Cecropia peltata and other substrates, Chesterville Youth Development Camp, above Newcastle, St. Andrew Parish, 8.I.1971, R. P. Korf et al. (CUP-MJ-1); on wood, near Dick's Pond, west of Hardwar Gap, near Holywell Recreation Area, St. Andrew Parish, elev. 2800 - 3000', 11.I.1971, R. P. Korf et al. (CUP-MJ-326), on twigs, Cinchona Botanical Gardens, St. Andrew Parish, elev. 4750', 8.I.1971, R. P. Korf et al. (CUP-MJ-53); on twigs, Cinchona Botanical Gardens, St. Andrew Parish, elev. 4750', R. P. Korf et al. (CUP-MJ-47). Venezuela: on unidentified mossy log, trail from Qubrada Mariperez, through Vivero El Cuno and El Papelon to ca. 1 km. below Hotel Humbolt, El Avila, Parq. Nac. El Avila, Dto. Fed., K. P. Dumont (VE-6194), R. F. Cain and G. J. Samuels, 27.VII.1972 (NY); on unidentified wood, along trail 1-2 km above las Venados, El Avila, Parq. Nac. El Avila, Dto. Fed.,

K. P. Dumont (VE-5828), R. F. Cain, G. J. Samuels and B. Manara, 24.VII.1972 (NY); on unidentified wood, vicinity refugio "No te Apures," south facing slope of La Silla, Parq. Nac., El Avila, Edo. Miranda, K. P. Dumont (VE-3810), G. J. Samuels and B. Manara, 30.VI. 1972 (NY); on unidentified wood, between refugio "No te Apures" and Quebrada Los Palos Grandes, south facing slope of La Silla, Parq. Nac. El Avila, Edo. Miranda, K. P. Dumont (VE-3743), G. J. Samuels and B. Manara, 30.VI.1972 (NY).

Cookeina colensoi - Argentina: ad ramenta arborum semper virentium in silva marginali, locia umbrosis, Punta Lara, Prov. de Buenos Aires, R. Singer (S121), 9.VI.1949 (Herb. R. P. Korf 2129). Brazil: Sao Leopoldo, Dr. J. Durra (NY). Samoa: C. G. Lloyd, 1904-05 (NY).

DISCUSSION

These studies show that C. venezuelae and C. colensoi have gelatinous material in their apothecia and that they are practically identical to one another anatomically. In fact, they can easily be confused if the ascospore ornamentation of C. venezuelae (composed of longitudinal and transverse ribs) is overlooked. Even their ascospore size falls within the same range. Despite the gelatinous layer these two species agree anatomically with the other species of the genus, C. tricholoma (Mont.) Kuntze and C. sulcipes (Berk.) Kuntze.

The presence or absence of gelatinous zones in apothecial tissue has been used as a generic character in certain discomycetes. One such example is the distinction between Cookeina and Boedijnopeziza S. Ito and Imai. Boedijnopeziza, a segregate of Cookeina, was erected to accommodate C. insititia (Berk. & Curt.) Kuntze, a species with a gelatinous layer (Boedijn, 1933) and smooth ellipsoid to subfusoid ascospores. Though C. insititia is distinctive in several other features, the presence of the gelatinous layer and smooth ascospores has been considered paramount as generic characters of Boedijnopeziza. Based on the correlation between smooth ascospores and a gelatinous layer, Korf and Erb (1972) and Korf (1973) concluded that C. colensoi should also be accommodated in Boedijnopeziza. The present report of gel in C. venezuelae, a species with ornamented ascospores, not

only necessitates a reassessment of Cookeina, but also casts doubt on the advisability of accepting Boedijnopeziza. Although Boedijnopeziza is by no means accepted by all investigators, it has been recognized by Rifai (1968), Korf (1971, 1972, 1973), and Otani (1972).

It now seems clear, however, that gel as a single character or in combination with smooth ascospores is not sufficient to distinguish Boedijnopeziza. Furthermore, certain critical information about C. insititia is lacking. Boedijn (1933) observed that the marginal apothecial hairs of C. insititia were formed from the rupture of a membrane covering the hymenium. I have not observed this formation, nor to my knowledge has any one else. In the other species of Cookeina the hairs do not develop in this mode. The presence of such a membrane and the origin of the marginal hairs from it needs verification. Another deficiency in our knowledge of C. insititia concerns its pigmentation. The apothecia have been described as white (Boedijn, 1933) to pale pink (Rifai, 1968). It has been generally assumed that carotenoids are lacking. Determination of the chemical nature of the pigments present might help to resolve the question of accepting Boedijnopeziza.

One characteristic unique to C. insititia is the presence of only a single ascospore wall layer. This feature, first reported by Boedijn (1933), has been verified in this study. The other species of Cookeina, including C. colensoi and C. venezuelae, all have double spore walls. The walls separate readily in 10 - 15 % KOH. Although this characteristic is singular, it is not significant by its self as a generic character.

Thus, I agree with Le Gal (1953), Denison (1967), and Eckblad (1968) concerning the retention of C. insititia in Cookeina and suggest that both gelatinized and nongelatinized forms be accommodated there. There is little warrant for accepting Boedijnopeziza until developmental studies and possibly pigmentation studies provide more information. Boedijn (1951) placed C. insititia in Microstoma Bern. and held that justification for accepting Boedijnopeziza was insufficient. I agree with Rifai (1968) and Eckblad (1968) who reject this placement. Though there are macroscopic similarities between the apothecia of Microstoma and C. insititia, the morphology

of the hairs differs. In Cookeina, including C. insititia, the long, prominent hairs are composed of numerous longitudinally fused hyphae, whereas those of Microstoma are composed of single long, septate, thick-walled hyphae.

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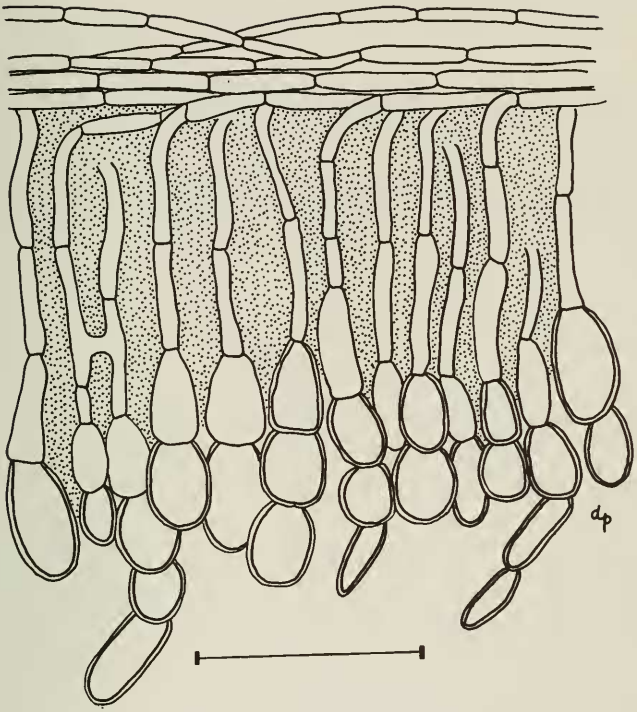

Fig. 1. Cross section of an apothecium of Cookeina venezuelae showing the ectal excipulum and part of the medullary excipulum. The stippled area represents the gelatinous zone. Scale equal to 40 µm.

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